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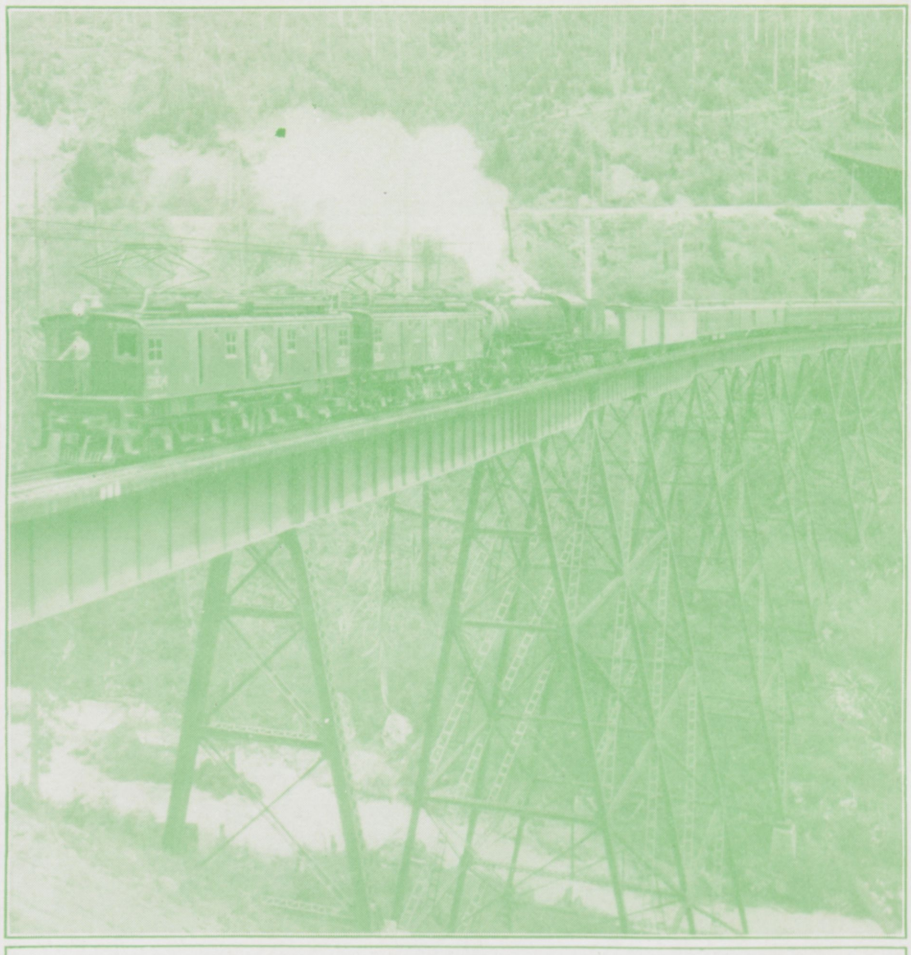

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YOUNGER COLLEGE MEN
ON RECENT WESTINGHOUSE JOBS

The Great Northern Electrification

Where do young college men get in a large industrial organization? Have they opportunity to exercise creative talent? Is individual work recognized?

SKYWARD from Skykomish climbs the Great Northern in Western Washington — up twenty miles of 2.2 per cent grade, around sharp 10-degree curves, scaling the Cascade Mountains, at an elevation of 3,000 feet. The new 7¾ mile electrified Cascade Tunnel, now building, will be the longest railroad tunnel in America. Besides shortening the present route 7½ miles, it will bring the maximum elevation below the level of excessive snowfall. Preliminary to its construction, and as an earlier step in the ultimate electrification of all trans-Cascade trackage, the section between Skykomish and the entrance to the present tunnel was electrified in 1925.

The big jobs go to big organizations. Westinghouse attracts young men of enterprise and genius because it daily provides facilities and opportunities which smaller companies can seldom offer.

A noteworthy feature of the Great Northern electrification is the use of motor-generator electric locomotives. These new-type locomotives draw high-voltage alternating-current power from the wire and convert it, on the locomotive, into low-voltage direct-current power for the driving motors. This system eliminates the need of substation power-converting equipment along the railroad right-of-way.

Westinghouse

THE ROSE · TECHNIC

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ENGINEERING has become a comprehensive term which covers a constant search for better methods, whether they concern short cuts in mental processes, critical analyses, the introduction of automatic machinery in labor-saving devices, or any other constructive effort. It also points out to a man a definite goal, shows him how to shape his efforts, and marks the way by which he may attain his object."

Gerald Swope.

Public Utilities

V. J. Mitch, e. 28

PUBLIC utilities are the foundation upon which the commonwealth is furthered. All classes of people desire ready acess to transportation, light, water, power, telephones, etc., in order to develop their communities economically. It must be ever remembered that the growth of a community, and its wealth, are largely dependent on public utilities.

The connection of public utilities with our present industrial status is greater than the public generally realizes. It is taken as a matter of course, that when we want light we press the button, and turn the faucet if water is wanted. Our transportation lines serve us only as we demand.

Public utilities may be operated on private capital, as is often the case; but many municipalities have either taken control of certain public utilities or have installed plants especially for water and light under a system of public ownership. There are several outstanding examples of this in the United States; Kansas City for example, handling both light and water plants, serve their public well and maintain lower rates than other cities of similar size with privately owned plants. Kansas City also reaps a nice yearly profit from their utilities in combination.

THE question of public or private ownership of public utilities is a vital one in this country at the present time. In this article are shown a few of the considerations that must be taken into account before the problem can be solved.

The investment of private capital in public utilities should be encouraged with an aim to the further growth of the community. A new and undeveloped community, state, or city, cannot publicly build all its utilities. Aside from the encouragement of the investment of private capital to encourage further growth; private capital is necessary as a result of too rapid past growth. An example of a state which has grown too rapidly and cannot build all or the greater part of its utilities, is California. Excluding steam railways, ninety-five per cent, in value, of the public utilities are privately owned.

There is, however, in the United States, a decided trend toward public ownership of public utilities since 1900. In California, both the Railroad Commission and the Courts have recently prevented privately owned utilities from entering a municipality which is already being served by another privately owned public utility of the same class. Our highest federal courts have confirmed the right of the public to enter the field of a privately owned utility in competition, without the legal obligation either to condemn or purchase the privately owned plants. The people have the right to serve themselves, and though the public should be able to enjoy the profit of their own service, there is a broad impartiality involved that requires the protection of the privately owned utility which has been built in good faith and is being operated under public regulations so that its rates are just and its service sufficient. It would be a public detriment to confirm the idea that private investments are to be overridden unfairly and in such a manner as to injure legitimate investments.

Neither the California Railroad Commission nor the Californa Courts have ever expressed themselves as to what would be a reasonable rate for a publicly owned utility to charge its consumers. The Wisconsin Railroad Commission has expressed itself that the rate should be fixed in the same manner as though the utility were privately owned, the theory being that, where a publicly owned utility is in competition with one privately owned, it should not be given such preference as to result in the destruction of the value of the private plant. For example, if a city goes into competition with privately owned plants for the sale of electrical energy within its boundaries, and the interest on the bonds and the sinking fund is paid from the general tax, it would put such a handicap on the privately owned plant as would ultimately work its destruction.

The rates for a public utility service should be based on the fair value of the properties used and useful in the services, irrespective of whether the plant is privately or municipally owned. The municipal plant should be viewed as an investment of public funds by the city, and it should be operated with the view of obtaining a profit on the investment.

The rate for a privately owned utility should be adequate to provide, first, for the expenses of operation and maintenance, second, for depreciation, and third, for an interest return on the fair value of the property. With a municipally owned utility,

in addition to these expenses, there is a bond redemption fund.

The rates of public utilities are at the present day usually fixed by commissions, both state and federal. The value of the property being determined and the rate of return fixed, the work of the commission in establishing the charge of the public utility is comparatively easy.

This, however, is true of certain kinds of public utilities only. Take, for instance, a water plant or a gas plant, which serves merely a single community. As a general rule, it meets no competition in that service. The amount of its business can be forecast easily with reasonable accuracy. Even matters of depreciation and the like are accurately understood. It is possible, therefore, to fix the rates of such a utility when the value of the investment is known.

With the railroads, however, this is entirely different for the reason that it seldom happens that a single railroad can be considered by itself. The greater part of the business of the railroads of the United States is subject to competitive conditions of one sort and another which are largely controlling factors, so that the rates of one are necessarily bound up with those of another.

The railroads of this country are so bound up together that their rates are largely interdependent. It is utterly impossible to separate one railroad from every other and fix its charges upon the basis of fair return upon its fair value as you would with a gas or water plant.

Whether or not it is proper to base rates on the so-called "value" of the property is the large question now in the minds of those interested in public utilities. The fact is that in many instances, including cases of ralroad rates the reasonablness of rates has been so determined and in making their decisions in disputed cases, the courts have held that a public utility corporation is entitled to earn a fair return on the fair value of its property used in the public service.

Whenever the determination of the reasonableness of rates is reached in this way, it is necessary to value the property, and to value it in such a way that justice shall be done to the corporation and to the public.

If a new property, just ready for operation, is to be valued in connection with the determination of fair return, then, because working capital will be required, unfinished work must be completed, and development expense incurred. A reasonable and proper basis for what the courts have called "fair value" is the actual investment in the property devoted to public use, plus an estimated sum for working capital, final completion, and development expense. Such a basis is the most reasonable one to use in this connection, because a fair return on such a sum would be a fair return on the investment, and this is what is needed to attract capital to such properties.

In the case of old property, the owner should be entitled to reimbursment through the earnings for all current expenses for operating the property. The owner of the property should be entitled to an allowance sufficient to provide for the net depreciation in the value of all physical property.

It is clear that the law does not provide for the inclusion of unused property in a valuation for the purpose of rate regulation, but there must be much difference in opinion in the determination of the property to be classed as "used" and "unused." Although a few of the cases by the courts indicate a tendency toward the exclusion of all property not actually used in cases of doubt both the courts and commissions have practiced including rather than excluding property.

Property considered to be devoted to the public use, and to be valued, should include, not only that in active use in the daily operations, but that which is properly and reasonably held in reserve to insure the continuity of the service.

As an example of preceding statments, railroad equipment may be stored during periods of depression; snow-plows are in use only a very small portion of the time, and thousands of other cases might be cited of property not actually in service at the time of the valuation, but useful and essential as a part of the equipment of the property. No rule of valuation which excluded such property could be set by sound reasoning, as the life of the service depends to a large extent on sufficient reserve to tide over emergency or peak business. Such property should be included in regular valuation.

In regard to real estate, in a valuation for the purpose of rate regulation, there should be included, not only the lands actively in use and covered by the construction, but such additional area as is necessary to permit economical construction of the works, to safeguard the property, and protect it from hazards which might interfere with its operations. Good business judgment in the acquisition of land frequently requires the purchase of a whole tract or large area of land when the greater part of the parcel is required for the purpose of the utility. All the land thus acquired should be included in a valuation.

Closely related to the question of used and unused property is that of excessive size or capacity. It is often claimed that the public should not be required to pay rates on works having a size or capacity in excess of that required for the pupose of the community served. It is the decision of the various public service commissions, which take the valuations, that there should not be a reduction in the valuation on account of excessive size or capacity, except when the excess is so great as to be clearly unreasonable and is the result of careless foresight. The opinions of engineers and others engaged in building public service property differ as to what length of time for which it is economical and proper to make provisions under the different circumstances, and property built with reasonable foresight should not have its value diminished because expectations have not been fulfilled by prophesied developments.

Another important item which tends to determine a reasonable rate for public utilities is depreciation. For the convenience of the reader, it will be considered that the term "depreciation" covers all the losses of value that occur in property, plants, and other parts of the utility property,

(Continued on page 10)

The History and Status of the Dawes Plan

Morris T. Shattuck, ch., '29

IN taking up the method of solution of the present problem of the settlement of the inter-allied debts, and the immense problem of German reparation payments, the economists have undertaken one of the greatest problems in economic history. The late world war was by far the most involved and far reaching that has ever taken place in the annals of history. The causes of the war arose from wide and varied sources, and the results and readjustments brought about by it seem to reach even farther in their effects. However, it has been pointed out by many that the present unrest throughout Europe is not the result of the world war, but is the same unrest which caused the conflict, and which still boils and surges in the hearts of the nations. The expression has been made that there is more science used in the hulk of a single battleship than there has been employed in the international affairs of the world since time began. Nevertheless the problem remains: How can these nations meet their obligations and get back into friendly relations one with another?

THE foreign relations of our government present an interesting study, and one with which every college student should be familiar. This interesting presentation of some of the features of the Dawes Plan should prove enlightening.

At the close of the war the Treaty of Versailles set no specific amount to be paid by Germany, but left that task to the Reparations Commission. This commission met May, 1921 and, even at that date two and a half years after the end of hostilities, set a sum of thirty-three billion dollars to be paid as a principal sum and a second sum of seven-hundred-fifty million dollars to be paid annualy, beginning at that time. The commission surely did not inquire into the economic possibilities of the case, because the sums named are entirely too great to be plausible.

Germany has an area of some 208,780 square miles and a density of population of 311 per square mile. The United States has 3,000,000 square miles with but 31 to the square mile. The average German, previous to the war, had an annual income of $146 while a person in the United States received $335, showing that Germany even before the war would have been severely taxed to produce $750,000,000 annually, to say nothing of the $33,000,000,000 principal sum. After the war, with her colonies gone, her area and population reduced, part of her territory under foreign control, her fleet gone, many foreign investments disposed of, foreign trade organization and markets disorganized, Germany was entirely unable to meet the payments. Nevertheless a few payments were made which in a short time dwindled, with the result that the creditor countries became restless and France took the initiative by occupying the Ruhr. It was a rather delicate situation then in the latter half of 1923. Both political and economic chaos seemed impending. As many as fifty percent of the German people were in need of charity. Matters were apparently becoming worse instead of better.

It was in this chaotic situation that the committee of experts, with Mr. C. G. Dawes as its Chairman, was appointed by the Reparations commission. Their job was designated to be the determination of the amount which Germany really could pay per year and to prescribe the manner in which it was to be paid. This total task the committee separated into two main divisions under which all the difficulties under their control might be dealt: (1) To stabilize the German currency, (2) To balance the German budget.

After three months of study the report was ready on April 9, 1924. The extensive report included in detail their results and recommendatins to the commission. It was so complete and contained so many sound economic principles that it is considered an excellent work by many economists.

The first function was to stabilize the currency. To accomplish this end, a new bank was to be established which would issue all the currency and which would be under the control of a board of fourteen, seven Germans and seven foreigners. This bank to be established by an external loan of $800,000,000. With this bank in operation the plan called for the withdrawal of all the old currency. All the internal debts and obligations were done away with by a nation-wide inflation, thus starting the new financial system on a clean slate. This, necessarily, caused much loss and a great deal of suffering but it was the only sure and swift way to handle the situation. In fact, it is believed that the other countries of Europe must do the same

thing to get rid of their internal loans before there can be much done toward a final settlement of the difficulties which are confronting them at the present time.

After making provision for the new currency and establishing this new bank, the committee of experts took up the second and greater task, that of balancing the budget. Now to balance the budget with a sufficient surplus to account for much reparation, it was necessary to draw money from every available source. There were three major sources that were taxed especially: (1) the people as a whole, (2) the railroads, and (3) the industries.

First, the people were taxed rather heavily but within reasonable limits. They were given two years of recovery after the issue of the new currency in order that they might get on their feet again. After the two years, however, they were taxed as heavily as any of the people of the allied countries; in fact, it was mentioned in the report that the German people should bear as great a burden as any of the people of the countries upon whom they waged war.

In the second place, the railroads of Germany were in a bad way. They were suffering from an over-staff and from an extravagant capital expenditure both of which were done, no doubt, in the name of helping the great number of unemployed then in Germany. The railroads were, just as our postal system is in the United States, not a paying business. Each year there was a deficit while the railroads operated in the interest of industry instead of attempting to make a profit and be self-supporting. The Dawes plan called for a complete change in policy and management whereby a profit might be made and a surplus obtained.

The third source of income was the industries. The industries of Germany are her main power; Germany is primarily a manufacturing nation. Therefore the industries were taxed to help along the reparation payments.

All these incomes were proportioned out through five years, at which time the payment would be at its height, where it will stay until the reparations commission sees fit to make further arrangements. The schedule is given below:

First year
1,000,000,000 gold marks—or—$250,000,000
Second year
1,220,000,000 gold marks—or—$305,000,000
Third year
1,200,000,000 gold marks—or—$300,000,000
Fourth year
1,750,000,000 gold marks—or—$437,500,000
Fifth or Standard year
2,500,000,000 gold marks—or—$625,000,000

These sums are deposited in the bank of issue from the various sources just mentioned and the job of distributing the payment is given to the nations concerned. Thus Germany has fulfilled her duty when the bank has the required sum of credits to her name and the receiving countries must care for the exchange.

The whole system may be compared to a tank with inlets and outlets. The inlets connected with the three sources: people, railroads, and industries. The tank itself is the bank where funds are kept and the outlet is the other countries who are to receive the funds.

The report makes plain that this apparently lovely plan cannot become a success unless the economic sovereignity of Germany is restored. Germany must gain back her original trade; in fact, she must gain more than her original trade, because previous to the war her exports were less than her imports and this is the reverse of what must now be if these sums are to be paid.

There are but three ways by which an international debt can be paid, (1) in gold, (2) in services, (3) in goods. Of these three, gold and services are out of the question because first, Germany has no services, and second, the United States has control of more than half the gold coin and bullion in the world and Germany could pay practically no gold at all. Therefore there is but one thing to do—pay in goods.

This fact brings up another angle to the situation which is of importance to determine the success of failure of the entire plan. That is, not the ability of Germany to fill this reparation tank, but the ability of the receiving nations to empty the imaginary tank.

England, for instance, has her factories and has her trade balance coordinated in such a manner that she has even now a great unemployment problem. It is not reasonable to think that she can take any large bulk of German goods as payment of debts. France, likewise, has her exports to care and her industries to protect. Thus the same situation is felt in nearly every country with the same result.

Germany has been unable to get that export balance. Nevertheless they have kept their part of the plan up to the close of 1925 and it seems that they are doing better than was expected. In order to make payment some such scheme as this was used: The bank of issue sells credits to the public in the receiving countries and the public will use these credits to buy the things they want. These purchases will be goods, services, securities, etc. which may be bought directly from Germany, or from other countries. For example, France might draw against these credits to the amount of, say, ten million marks to buy dye stuffs in Germany, and then might draw on the fund for a second ten million marks to use in buying coffee in Brazil, the Germans having previously obtained a corresponding credit in Brazil by shipping to Brazil an equivalent value of German cutlery. In this way it is barely possible to make payments without an actual excess of exports over imports.

This arrangement puts the United States in a queer situation. England, France, Italy, Germany, etc. owe us large sums from loans made during the war. They lay the blame on Germany for the war and insist that she pay the bill; therefore have Germany pay us to settle the debts of these other countries. From this system of exchange and from the smallness of the payment this is impossible. Especially is it impossible when we put up a high tariff wall to protect our factories. At the present we are holding an export balance of half a billion dollars per year and are accepting more and more promises to pay. In 1924 we loaned $54,000,000 to Europe of which one fourth went to France.

(Continued on page 12)

Economic Importance of Television

L. P. Kniptasch

THE problem of transmitting drawings, figures, and photographs from one point to another by means of electricity has confronted scientists and engineers for a long time. The desirability of picture transmition over wires has been recognized for many years.

None of the systems devised before met the requirements of modern commercial service. The Bell Telephone Laboratories have now worked out a system, which seems to meet all requirements.

Television would be of no use in the world unless pictures which are transmitted appeal to the vision or transmit information.

As far as the practical application of television to the everyday life is concerned, the process is still too complicated and costly. When telephones first came into existence the engineers were up against the same problem. This was overcome by placing one telephone in a locality; usually at a grocery or drug store. If you wished to call up a friend in another part of the city you paid the clerk to allow you to use the phone. You then called a store near your friends home. The clerk in this store received payment for calling your friend to the phone. This was before the pay telephone had been invented. Initial uses of the television will be marked out in a manner similar to this. One television instrument would suffice for a town the size of Terre Haute. Officials of the companies interested in television, namely: Bell Telephone Company, American Telephone and Telegraph Company, and The Western Electric Company, think that it will not be long until this will be done.

TELEVISION is rapidly developing from a scientific curiosity and is beginning to assume an important commercial position. This article points out some of the many uses to which television may be adapted.

Illustrations of cases where a written description is almost impossible, are, portraits, drawings, maps, or other representations of transient conditions. These cases will be some of the chief uses of television.

Work in electrically transmitted pictures in connection with police work has been recognized from the earliest days of experiments in transmission of pictures by electricity. In July 1924 the Police Department of New York City sent the fingerprint of a criminal whose complete identification data were on file in the Police Department in Chicago. This single fingerprint together with a description of the prints of all the fingers, was transmitted to Chicago and identified by Chicago experts almost instantly. This method of identification will be of value where difficulty is now experienced in holding a suspect long enough for identification to be complete.

The fact that an electrically transmitted picture is an exact and faithful copy of the original makes television very useful in the transmission of original messages or documents in which the exact form is of importance, such as autographed letters, legal papers, and signatures. It would seem that this method might, under certain circumstances, save many days of valuable legal time and the accumulations of interest on money held in keeping. For these reasons it would seem that bankers, accountants, lawyers, and large real estate dealers would find television a very useful service to them.

Messages in foreign languages, employing alphabets of forms not suited for code in telegraph are handled to a decided advantage by television.

Advertising material, particularly when in the form of special typography and drawings is often difficult and costly to get to distant publishers in time for certain issues of periodicals and magazines. Again, television will come to the front by offering a cheaper method by which these drawings can be sent.

A very large field for the transmission of pictures will, of course, be the press. They are interested in the speedy transmission of pictures. This can be seen by the use they have made of aeroplanes, special trains, and other means of conveying quickly, portraits and pictures of special importance to all the large news distributing centers. Many newspapers are now running daily picture pages of important doings as a regular feature. Electricity being faster than any of the other methods of getting pictures heretofore used, the use of the television will score a 'scoop' for that particular newspaper using it. Possibilities of this were demonstrated by the picture news

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The Why of the Televox

By R. J. Wensley

UNLEASHED by the sight of two mechanisms carrying on an animated telephonic conversation with one another and executing orders delivered over the phone, the vivid imagination of the newspaper reporters and special writers have run riot and many remarkable and unexpected attributes have been thrust on the Televox. It is the purpose of this article to give the real and serious purpose back of this development. Even granting the theoretical possibility of such a device, it is not intended that a home model be put on the market with the ability to prepare soup when given the proper code of whistles over the phone from the afternoon bridge club. But in all seriousness the device may make the preparation of the soup possible by enabling the power system dispatcher to reroute the supply of electricity so that service may be quickly restored to the electric range after a storm, fire or other disaster. The Televox was developed to supplement but not supplant supervisory control systems which have come into such general use in the last few years. The use of small distributing substations is becoming more and more the accepted method of supplying the electrical needs of large cities. To carry this plan to its logical conclusion these stations must be unattended. Wholly reliable means are available for the periodic reclosing of the local distribution feeders. It is not so simple to control the incoming high tension feeders which may form part of a ring or other complicated network. It is most desirable that the system operator be given some means by which he can issue instructions to the apparatus in the unattended stations and receive replies that his instructions have been obeyed. For important or large substations where the expense is warranted, there is no better method than by the use of one of the available types of supervisory control. These systems require individual control circuits of from two to four wires. These wires may be specially installed for the purpose or may be leased from the telephone company. In either case there is considerable expense involved. For the more important stations this expense is fully warranted, but for the lesser stations the tendency among many power companies is to take a chance and depend on quick transportation to get a man to the station after an outrage. If a man were actually in the station, the solution would be quite simple. The dispatcher would pick up his telephone, call the substation and order certain breaker movements. But, as we have already stated these stations are too small to justify human attendance, hence, the telephone is useless.

The public telephone systems have been brought to a high state of perfection. Recent improvements in operating technique have greatly speeded the connection time of the Bell system. In spite of the timeworn jokes regarding the slowness of the exchange operators it is now a matter of common comment that connections are secured with an accuracy and speed that leave but little to be desired.

With this great and reliable means of public communication available in every corner of our cities and towns it seemed a pity that it could not be used for the purpose of controlling these small, unattended stations. If there were only a machine with sufficient intelligence to answer the telephone and carry out a few simple instructions and give some replies, the problem would be solved.

In response of this need came the Televox. This is literally a machine endowed with enough apparent intelligence to carry on a conversation over a standard telephone through exchanges and their connecting cables in exactly the same manner as would a human operator, were such available. This device must not transgress the rules laid down by the telephone companies regarding attachments to their lines or instruments. Every effort is put forth by these companies to maintain their service at a high degree of efficiency. This could not be done were unauthorized persons permitted to make changes in the electrical circuits or the telephone instruments themselves. The telephone companies' very rigid but justifiable restrictions, therefore, made it necessary that the Televox actually "listen" to the receiver and "speak" into the transmitter.

The standard telephone systems provide channels which will carry all frequencies between 300 and 2800 cycles with a reasonably small attenuation. The operating tones or "voice" of the Televox must stay within these limits. For the first sample, which is the one that has received such wide publicity, tones corresponding to 600, 900 and 1400 cycles were chosen. It will be noted that the upper frequency falls between the second harmonics of the two lower frequencies. This is necessary to prevent possible false operation due to the harmonic operation of the amplifier for the higher frequency, should this be a multiple of one of the lower frequencies.

The first model, described in this article, is an experimental device and is necessarily crude. It in no way exhausts the possibilities in this new form of control.

The dispatcher's equipment consists of three tuning fork oscillators, a two-stage audio amplifier, a loud speaker unit and three push puttons. The standard desk telephone is placed on the desk in front of the loud speaker unit.

At the substation there is a larger cabinet which contains a two-stage amplifier, three ladder type filters and three individual frequency amplifiers. Relays in the plate circuits of the output tubes in these final amplifiers operate the selective portion of the equipment. A set of telephone relays and selector switches comprise the selective equipment.

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Research and Progress

Conducted by M. Heinig, ch., '28

Strength of Concrete in the Curing Stage

THE interest in concrete of high strength at early ages, particularly in connection with highway work, led to the investigation of methods for securing this property with standard portland cement. A number of factors operate together to increase the strength at early ages, the more important being the quantities of water and cement and the temperature of curing.

If the relation between amount of water and amount of cement be plotted against compressive strength, plotting as abscissae, U. S. Gals. per sack and as ordinates, per sq. in., a flat almost linear curve with a small negative slope will be obtained. A series of such curves will be obtained if a curve for a definite temperature is drawn for several different temperatures. All will have the same shape, but the curves of higher temperatures will have larger ordinates than those of lower temperatures. This merely means that a higher temperature (within limits) of curing gives a higher compressive strength.

If a group of such curves as described be made for curing periods of 1, 3, 7, and 28 days, it will be seen that the compressive strength increases with longer curing, the rate of gain of compressive strength being rather rapid at first and gradually slowing up as the end of the 28-day period approaches.

We see then that the compressive strength decreases as the ratio of water to cement increases, and that it increases with the temperature of curing and with the time of curing. Thus to secure a higher strength at an early age, a low ratio of water to cement and a comparatively high temperature of curing should be used. Calcium chloride of calcium oxychloride may also be used to give an early strength. Different cements, however, behave differently with this treatment. With some cements, 2 to 4 per cent of calcium chloride gives the greatest acceleration without decreasing the strength ultimately.

—Revised abstract from "Roads and Streets."

Electrical Insulating Oil

The use of higher voltages, and the danger of failure of apparatus in service, has stimulated the interest of public utility companies and other users of electrical apparatus in the considerations relative to insulating oil. These considerations include: requirements for insulating oil, its manufacture, storage, placing in service, maintenance, inspection and testing, and sampling.

In order to function properly, the oil for transformers or circuit breakers should have a high dielectric strength; should be free from inorganic acids and corrosive sulfur; should have low viscosity to be useful in effecting good heat transfer in transformers and to dissipate the arc in circuit breakers; and should be resistant to emulsification, since the presence of water, which is difficult to avoid, lowers the dielectric strength or the oil and deposits on the insulation thus lowering the surface insulation.

The production of insulating oil involves the selection of a suitable crude, its distillation, treatment, testing, and delivering to the customer in good condition. The properties are sometimes opposed to each other, making a compromise necessary. For example, to raise the flash point it is necessary to increase the viscosity. A low pour test is essential for outdoor circuit breaker use. Napthene base crudes, containing little wax give a much lower pour test than paraffin base crudes.

The treatment of the fractions used for insulating oil consists of agitating with sulphuric acid, drawoff the acid and sludge formed, wash with water, neutralizing with alkali, and washing with water to remove the alkali. A filtration through fullers earth removes impurities and improves the color. Drying in a centrifuge or filtration through blotter filter press insures the proper dielectric strength. Great care must be taken not to contaminate the oil with moisture in transit.

—Abstracted from the "Electric Journal."

Improved Riley Super-Stoker

Important improvements have been made in the Riley Stoker made by the Riley Stoker Corporation of Worcester, Mass. Provision has been made for letting in air over the fuel bed by means of special ported refractory blocks in the front wall. The amount of air so admitted is controlled by a sliding damper which is operated by a hand lever.

Another important improvement is in the grate block construction. The length of the more recent multiple-retort stokers demands a large coal-feeding capacity. In order to obtain this capacity without undue wear of the moving parts because of the high speed required if small diameter plungers are used, a large diameter plunger with a long stroke, has been adopted. To overcome the disadvantage of a large plunger, which is a rather high ratio of retort area to grate block area, four grate blocks at the front of the stoker have been made narrower and the remaining blocks widened. This construction gives higher capacity, greater pick-up and flexibility.

Each section of the stoker is provided with a damper which is under the control of the operator so that he can adjust the quantity of air to suit the conditions of combustion at any section. These dampers are controlled by rods on the side walls of the boilers.

The clinker-grinder operating mechanism has been re-designed to provide a more variable means

of control. The principle of air zoning has also been applied to the Jones side-dump stoker manufactured by this company.

—Abstracted from "Power"

The Bergius Process in America

In the "Mechanical Engineering" periodical is told the story of the agreement between the I. G. Farbenindustrie and the Standard Oil Co. of New Jersey. It is referred to as an event leading up to "a new era in fuels". The fact that the Standard Oil Co., one of the largest producers of gasoline in the world, has found it advisable to promote the production of a new fuel which some day may take the place of gasoline, is of much importance to the whole industry.

We have been somewhat skeptical of the depletion of our mineral oil deposits within a period which would make us feel that it was necessary to make preparations for such a contingency. We may think of this possibility as we please, the fact that the Standard Oil Co., who ought to be informed on the subject best of all, has concluded this agreement, suggests that they see the time coming when the price of natural or cracked petrol will have risen high enough to give the liquid fuel from coal a competitive chance. The agreement is of considerable economic importance, since there has been initiated the large-scale production of fuel from coal according to the aforesaid process, and there arises consequently the necessity of solving the problem of designing the plant required by this process.

—Abstracted from "Engineering Progress".

Alcohol-Gasoline Blend Shows Advantages in Road Test

Tests under normal driving conditions have shown that alcohol in the anhydrous condition, as a constituent of motor fuel, has anti-knock properties as well as possessing the ability to reduce carbon deposits. The U. S. Industrial Alcohol Co., a number of years ago, began a rather intensive study of the use of industrial alcohol as a constituent of motor fuel. After preliminary investigation, it was found that anhydrous alcohol mixed with ordinary gasoline, in any of several different proportions, constituted a motor fuel having many valuable properties. The most important of these properties were: smoothness of general performance, and the possibility of long-continued periods of operation without the necessity of grinding valves or removing carbon from the combustion space of the cylinders.

The tests were carried out using different fuels for the same car traveling over the same distance, the car being driven by the same driver. After each run over the route, the fuel consumption and the amount of carbon deposit were noted. There was little difference in mileage between the alcohol-gasoline fuel and ordinary gasoline. The difference in amount and character of carbon deposit was, however, quite marked, the carbon deposit from the ordinary gasoline being much more abundant and harder to remove than that resulting from the use of the other fuel. Another advantage of the alcohol-gasoline fuel was that it gave a much better acceleration on hills.

—Abstracted from the "Chemical and Metallurgical Engineering."

Public Utilities

(Continued from page 4)

by means of wear and tear and other means of degradation.

"Should depreciation be deducted from the investment cost of a property before computing fair returns?" This is the question which has been subject to much discussion by those interested in rate regulation of public utilities. The question was discussed by C. E. Grunsky, member of American Society of Civil Engineers in his paper entitled "The Appraisal of Public Properties as a Basis for the Regulation of Rates." Mr. Grunsky contends that depreciation should not be deducted, for rate-making purposes, but the original investment plus improvements should be maintained for the regulation of rates. Other experts in various public service problems contend that, for rate making purposes, the depreciation should be deducted from the reproduction. Still another economist, interested particularly in this work, expresses the opinion that the cost of reproduction, less accumulative depreciation, is not the proper basis for rate making; however, this does not apply to the case where sinking fund for depreciation is in hand.

Here is seen disagreement among authors who have written on the subject. It seems desirable, therefore to present a further study of this question.

The sinking fund method seems more desirable for allowing for depreciation. This method consists in determining the necessary and useful life of the structures or machinery under consideration, and keeping separate from year to year a sum of money which, with its annual increment of interest, will replace the strutures or machinery in question, at the end of the assumed life.

As has been stated previously, the rates of municipal utilities are to be determined by public service commissions on the basis of fair return on the fair value of the property and the depreciation of the property; but however, the utilities should be established on proper bases and economically, carefully, and honestly managed, for the public wants the lowest possible rates. These are the problems of the public service commissions that have been made very difficult by economic conditions over which no state or national agency has any control.

When a rate petition is filed with a public service commission, the public service commission orders the petitioning company to file an inventory of its property used in the service which they offer. This inventory is then placed in the hands of the engineering department of the commission, which sends engineers over the property and makes an evaluation of the structural property. This evaluation is then filed with the commission to serve as a basis for rate making actually.

This evaluation which is made by the engineer-

(Continued on page 23)

Published Monthly by the Students of the Rose Polytechic Institute

The Rose TECHNIC

A Magazine Pertaining to Engineering and Allied Sciences

Member of Engineering College Magazines Associated

Engineering Show to be Given

Students and Faculty to Present Exhibit on April 19, 20, 21

FOR the first time in the history of the Rose Polytechnic Institute there will be given an exhibition of the various courses of engineering included in the curriculum of the school that furnishes the engineering world with so many capable engineers. This exposition has emerged from mere rumors to actual facts and now has each student, as well as every member of the faculty, working at top speed and giving all in their power to make of the show, the first in the school's history, a wonderful success.

Under the supervision of Professor Knipmeyer the student body has been divided and assigned tasks in the form of experiments or operating some of the motors and other equipment used in the school. Professor Knipmeyer has an able corps of assistants, derived from the faculty and student body, who are working just as devotedly as their leader and who will make sure that the students will follow in their footsteps.

School Progrom Exhibited Fully

The various departments—Chemical, Civil, Architectural, Mechanical and Electrical—will have such exhibits as can be given from their courses of study and the nature of equipment used in the various departments. However, the departments of Physics, Military and Shops will give their part towards presenting a program that will cover all the work done in the various courses. They have been assigned a sufficient number of students to exhibit these courses of study and will assume positions of prominence equal to the recognized departments. has been named "The Rose Show", not only to show the visitors just what is done at the school,

The Institute plans to hold this exposition, which but to acquaint the visitors who have a slight conception of engineering a better knowledge of the school. It has long been felt that since the school was moved to its present site that the people of Terre Haute and of this vicinity have failed to keep in touch with the school and know very little of the progress it has made. In the way the show will accomplish a double purpose—that of showing the people what is engineering and what Rose is doing in that field.

Will Not Be Purely Technical

The show will not be purely technical, for there will be experiments of the amusing and spectacular type. Some of the departments, furthermore, plan to exhibit motion pictures in conjunction with their programs, which will make the show more appealing to the visitors.

According to plans the show will be held on the three evenings of April 19, 20, 21. The students and members of the faculty are working hard to assure that the show will be one of interest and education to all. Alumni and people of this vicinity are urged to some and see what Rose is accomplishing in the great field of engineering.

Much Ado About Nothing

The following article was found in the Technic waste-basket, and is printed here in the hope that the guilty party will break down and confess when he realizes what he has done. The views expressed in this article are not necessarily the views of the Technic editorial staff.
—Editor's note.

WHEN the windy season of the year rolls around, and the sound of the hammer and the saw is heard in the wood-shop, there is always some speculation concerning the history and identity of the great patron saint of the engineer, Saint Patrick. Every year, on the 17th of March, it has been our custom to honor the name of the great Irish engineer with becoming rites and ceremonies. Yet, just what kind of an engineer was this Saint Patrick, that he should be chosen above all others for the exalted position which he holds? Perhaps that has never occurred to most of us. We have

been taking him for granted for so many years—even centuries, that we follow the ancient custom blindly, without pausing to ask why.

Picture the familiar St. Pat of the engineer: soft hat of the well known Irish variety, a shamrock or two stuck in the band; red hair, whiskers, and nose, the latter preferably turned up; black vest covering a green silk shirt embroidered, or something, with little gold harps; black knee-breeches with large capacity hip pockets, in one of which there is a nicely balanced paving-brick, and in the other a—well, slide-rule; black woolen stockings and the well-known buckled brogans. All of this is mounted on a stocky individual who has the customary upside-down clay pipe in his mouth, a shillalah (that's right) under his arm and is dancing a jig on a bit of the sod of old Ireland.

Lets see what history says about him. Oh, yes, here it is on page 379. It says: "—among the missionaries who were effecting the spiritual conquest of Ireland, about the year 600 A. D., was a zealous young priest named Patricius, better known as Saint Patrick." That's all it says. There's not much there to lead anyone to believe that the old boy was an engineer of any kind, or anything else but a missionary. Then there's that name "Patricius". That sounds more like Latin or something, than Irish.

However, histories don't tell everything, and it is only by reading between lines that the real story may be learned. For thirteen centuries the beloved St. Patrick has been hailed as one of the world's most famous engineers, ever since a certain memorable day when he ushered all of the snakes, lizzards, toads, etc., etc., out of the Emerald Isle into the ocean.

It seems, then, that it was on this occasion that the world first officially recognized him as an engineer. Since that time, memories have dimmed, the story has changed in the telling of it, and the exact details have been lost, leaving us with only the bare fact that St. Pat was an engineer.

How can we, at this period of history, determine the branch of a profession with which a man identified himself so many hundreds of years ago? Two thousand years ago, Aesop said: "Eliminate the impossible, and that which remains is the possible." It is by working upon this theory that we unravel the mystery.

First, was St. Patrick a Civil Engineer? Well, you can see right off that that is impossible. Who can imagine a civil squinting at frogs through a transit, or chasing a bunch of black-snakes across the scenery with a rod? They simply don't move around fast enough for that, so that's out.

Was the venerable Saint an Electrical Engineer? Why, thats absurd! You can't shock a turtle, no matter what you say, and as for short-circuiting lizzards—I ask you, is it reasonable?

As for St. Pat being a Mechanical, thats out of the question. Who ever saw a picture of St. Pat in overalls? Besides, he couldn't drive snakes with hot air or mechanical refrigators.

There! we have eliminated the impossible, and now comes the most dreadful part of the whole story. Saint Patrick was not nearly as great as people have thought him all these years! Although he was an engineer, he didn't engineer the snakes out of Ireland at all. Poor St. Pat, by the process of elimination, was a Chemist, and as soon as he landed in Ireland the snakes and things all left on their own accord!

We will now stand and sing the Irish National Anthem:

"Saint Patrick was an Engineer, He was, He was, etc., etc.,

The End

The History and Status of the Dawes Plan

(Continued from Page 6)

How long can we keep this circle going?

Some of the English say that this will happen: France, for instance cannot pay their debts to us but have some money coming from Germany if goods could be taken in exchange. We cannot take the goods because of tariff restriction so we have the goods sent to Russia where there is a ready market and we in turn take their notes for the sum involved. In this way France lifts some of her debt and Russia becomes our new debtor.

However, in spite of all these hindrances, the Dawes plan has done better than was expected. Germany is recovering swiftly and is gaining the export trade. She has made the payments promptly. In 1929 the full scale amount will be due and the sum will be constant from that time on. It is well recognized that the payments cannot go on forever and that the Dawes plan is not final.

In conclusion, the Dawes plan has accomplished several things worthy of note. First, it has formulated a plan and executed it so that the internal finances of Germany have been strengthened. The budget has balance and the currency is on a firm basis. Second, it set forth a schedule of payments which seem capable of being filled and have been filled quite promptly. Third, it has brought Europe to the realization that there is a difference in political ambitions and economic possibilities. Fourth, it helped promote good will by omitting the phrase, very irritating to the Germans, "The Allied and Associated governments affirm and Germany accepts the responsibility of Germany and her allies for causing the loss and damage to which the Allied and Associated governments and their nationals have been subjected to as a consequence of the war imposed upon them by the aggression of Germany and her allies", which appeared in the treaty of Versailles. Fifth and most important of all, it provided a breathing spell for Europe first to work out each nation's own internal finances, then a complete solution to the problem.

The Dawes plan will soon have done its work. It is time that some further plan be adopted to finish the work begun.

Economic Importance of Television

(Continued from page 7)

service of New York and Chicago newspapers, during the 1924 Republican and Democratic National Conventions held at Cleveland and New York. Several hundred photographs of these two conventions were transmitted by wires between Cleveland and New York and New York and Chicago. Copies of these were furnished the Press at the receiving points. Photographs made shortly after the opening sessions were transmitted to New York and Chicago and were reproduced in the afternoon papers. Another demonstration of television news service was furnished the public on March 4, 1925. This was about the largest demonstration that has yet been attempted. Pictures of the inauguration of President Coolidge were transmitted from Washington to New York, Chicago and San Francisco. These pictures appeared in the afternoon papers of all three cities.

Other news-distributing agencies can also make use of electrically transmitted pictures. These are the companies that make a specialty of displaying large photographs of store-windows and prominent places about town. Electrically transmitted pictures of interesting events about which newspapers have published stories are suited to this service, and have already been used by some of these picture service companies. They may also be used as lantern slides for the display of news events of the day by projection upon screens in front of the newspaper office or in moving picture theatres. Cartoons of the day can also be transmitted by electricity to the newspapers.

The photographs of wanted individuals or of kidnapped persons can be transmitted to distant points.

Advertising can use television to a great advantage. Photographs of merchandise, of building sites, and of buildings for sale can be shown to a buyer in a distant town, thus giving him first hand information about his purchase without the purchaser leaving his town or even his office.

Motion pictures stells which are now distributed by aeroplane can be delivered over wire much more quickly.

In the sporting world there is a great opportunity for both radiovision and television. Radiovision will be to television what the radio is to the telephone. If a speech is being given that the whole public is interested in, and that the whole public should hear, the radio is used. If this speech is for a certain individual, then telephone or telegraph would be used.

With radiovision it would be possible to see such things as a world's championship baseball series, the big intersectional football games, or any big sporting event, while the announcer is giving a verbal description over the radio.

Though television is still in its infancy, and there is a large field for its advancement, it will be and is being used as one of the largest means of transferring pictures. People in all walks of life can use it to an advantage. As speed seems to be one of the most important items in the business and social worlds, television will help this out to a great extent. Now, places and cities that were within earshot of each other will be within sight also.

Television will be closely associated with telephone and telegraph, but it cannot be put in a class economically with these two. The reason for this is the difference in the mechanical makeup of the two.

The Why of the Televox

(Continued from page 8)

On the side of the box is a shelf on which the standard desk telephone is placed. The receiver is left off the hook and is placed on a microphone which forms the electrical "ear" of the unit. A weighted arm projects from the side of the box to depress the hook switch on the phone. This is arranged to be lifted by a magnet inside the cabinet. The telephone may be lifted from the shelf and used in the ordinary manner without the necessity for detaching or disconnecting any device. When finished with its use as an ordinary telephone, the instrument is replaced on the shelf and is immediately in readiness for automatic operation.

All language is but a succession of sound strung together in various combinations. As there are but few operations to perform, the language need not be complicated. The three frequencies before mentioned are used as three monotone syllables and all the various commands are translated into a language composed of these. This might be called "Televoxanto" with apologies to Esperanto.

Let us vision a scene in the dispatcher's office of a central station equipped with the Televox.

The telephone rings. "Dispatcher speaking."

"This is the service department. We have three calls from 26th and Y Sts.'

"All right. We'll investigate and call you back."

The dispatcher hangs up and turns to his system map. "Let's see. That will be feeder 16-S-5 out of sub. 16."

The dispatcher consults his telephone index and picks up his telephone receiver. "A line please," this to the private branch operator.

"Number please."

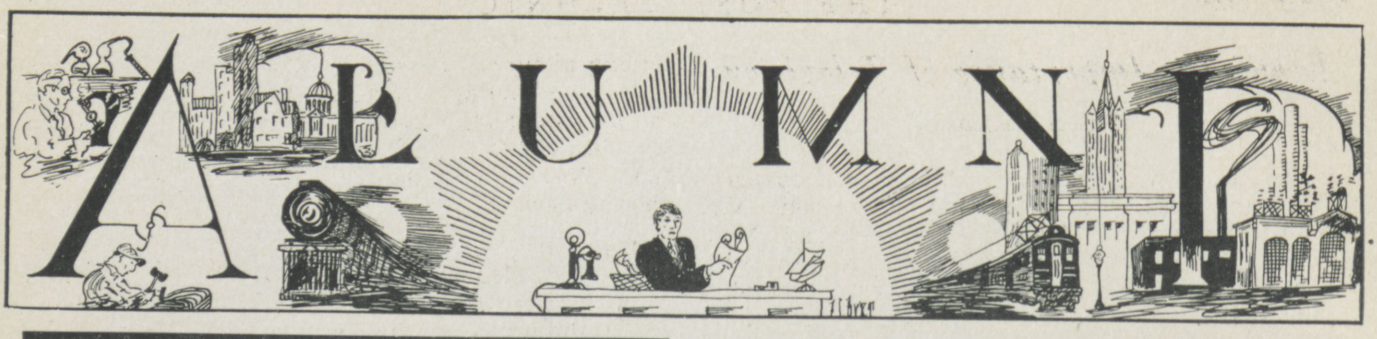
"Valley 6000."

"Thank you ... ... 6000."

And then the dispatcher hears in the telephone receiver, "Buzz ... buzz ... buzz ... buzz... buzz ... buzz ... buzz," which translated from Televoxanto into English says, "This is the Televox at Substation 16 speaking. What can we do for you?"

The dispatcher places his phone in front of the speaker unit on the front of his Telovox cabinet and pushes the button marked 1300 five times. The loud speaker says, "Tweet ---- tweet ---- tweet ---- tweet ---- tweet," which says to the substation, "Connect me with breaker number five and tell me if it is open or closed."

(Continued on page 26)



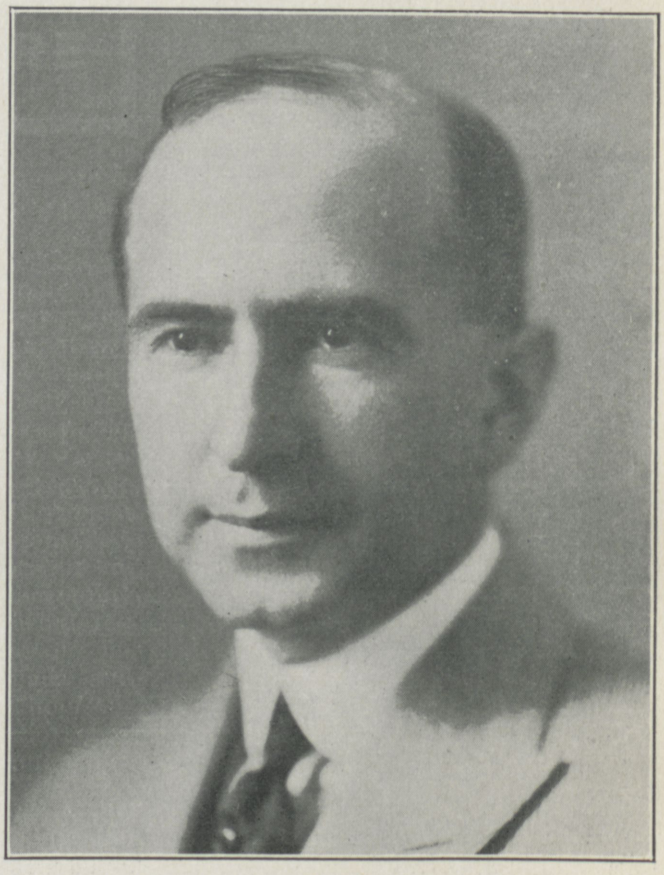
ALLEN H. MOORE

The following obituary notice concerning one of the prominent Rose alumni appeared in the February issue of the Journal of the A. I. E. E.:

Allen H. Moore, General Engineer of the General Electric Company, Schenectady and for some time the chairman of the Standardizing Committee, died Tuesday, January 10, at Albany, New York, after a brief illness. He was born at Rutland, Vermont, and his general education was public and high school followed by a 2-years' academic course at the University of Vermont at Burlington and two years at Rose Polytechnic Institute, where he took up electrical engineering. This he followed by student work in the factory of the Thomson-Houston Electric Company, Lynn, Massachusetts, upon the installation of lighting plants and later becoming "trouble man." He was then sent to Washington and later to the Pittsburgh offices. His work included the installation of plants in Canada and Mexico. He was also given charge of the Thomson-Houston Company's exhibit at the Frankfort Exposition, Germany, after which he became chief engineer and manager of the factory of the Union Elektricitaets Gesellschaft, a company originally formed by the General Electric Company and German interests. Mr. Moore was put in responsible charge of the designing and manufacturing for the company, which built a-c. and d-c. generators and motors of all kinds, as well as railway equipment and heavy electrical apparatus. The greater portion of the more intricate and important part of this design work was done by Mr. Moore, personally. In 1899 he went to London as general manager of works for the British Thomson-Houston Co., and in this capacity built and equipped the company's Rugby works. In 1901 however, he returned to the Engineering Executive Department of the General Electric Company, as assistant to Mr. E. W. Rice and chairman of the Standardizing Committees, which brought him in intimate contact with all the design engineering of the General Electric Company. He was a man of wide experience and of high worth.

The following article appeared in the issue of the Electrical World of December 10:

A hard worker and keen thinker, driving always toward a single objective and possessing unusual financial ability, Fred B. Lewis has risen through



Mr. Fred B. Lewis

the ranks of the Southern California Edison Company to the position of assistant general manager. He has never been identified with spectacular happenings, but rather has worked steadily toward a goal.

Mr. Lewis first came into prominence in 1924, when he filled the position of power administrator for the Southern California Edison Company during the power shortage of that year, and it was largely due to his unusual administrative gifts that this emergency was passed with so little curtailment of industry. Soon afterward he was promoted to the position he now holds. Since occupying this post he has inaugurated a system of budgeting all operating expenses by which every department in the company is kept within the limits set and it is possible to forecast nearly a year in advance what the financial statement will look like at the end of the year.

Born in southern California, Mr. Lewis was greatly interested and perhaps inspired as a young boy when he read about the building of what was

then a line of extremely high voltage by the Southern California Edison Company to transmit power from the Santa Ana River to Los Angeles. Two things were impressed on his mind—first, that this company was making history in the electrical industry; second, that the electrical industry attracted him more than did any other as a field in which he could do his life's work.

After graduation in electrical engineering from Rose Polytechnic Institute, Terre Haute, Ind., in 1905, he obtained a situation with the Southern California Edison Company, and he has been with that company ever since, occupying the posts of engineer of underground distribution, superintendent of the Los Angeles district, manager of operation, and since September, 1924, assistant general manager. As chairman of the power committee composed of representatives of all the power companies of the state, Mr. Lewis had an active part in the work of interconnection which has now knitted the physical systems of the California companies from the Oregon line to Mexico and has been of inestimable value to consumers.

Books Received by Alumni for Deming Hall Library

E. E. King, '01:

Tarbell—New Ideals in Business.
Lincoln—Steps in Industry.
Arnold—General Plans For A Passenger Subway System for Chicago.
Lish—Engineering Economics.
G. R. S.—Electric Interlocking.
Searles and Ives—Field Engineering.
Lish—Earthwork, Haul and Overhaul.
Jordan—The Practical Railway Spiral.
A. B. C. Of Railroad Signalling.
Wilson—Elements of Railroad Track and Construction.

C. E. Dahlquist, '25:

Farnol—The Money Moon.

Sidney Reibel, '21:

Oppenheim—Jacob's Ladder.

J. R. Sage, '15:

Quick—Vandermark's Folly.

Henry C. Gray, '17:

O'Henry—Options.
Walpole—The Thirteen Travelers.
Cameron—The Golden Rule Dollivers.

L. R. Wyeth, '11:

Bower—The Lure of the Dim Trails.
Beach—The Ne'er-Do-Well.
Grey—The Vanishing American.
Nicholson—The House of a Thousand Candles.
Porter—O Money! Money!
Parker—You Never Know Your Luck.

C. G. Wenzel, '93:

Reinhardt—The Breaking Point.
Parker—The Right of Way.

C. E. Robertson, '05:

Railroad Electrification Data.
Yeats—Irish Fairy and Folk Tales.
Dreiser—Free and Other Stories.
Wilson—Addresses and Messages.
Corbet—The Roar of the Crowd.
The Lure of Arizona.

H. L. Watson, '05:

Hope—Simon Dale.

Robert D. Landrum, '04:

Slosson—Creative Chemistry.
Gregory—Discovery, The Spirit and Service of Science.
Chamberlain-Browne—Chemistry in Agriculture.
Howe—Chemistry in Industry, Vols. 1 and II.
The Future Independence of American Medicine in the Age of Chemistry, A Report.
Lefebre—The Riddle of the Rhine.
The Life of Pasteur.

John Bennett Wilson, '26:

Nason—Chevrons.

P. W. Klinger, '96:

Thayer—Theodore Roosevelt.

A. M. Hood, '93:

Jacobs—Captains All.
Jacobs—Short Cruises.
Coolidge—Foundations of The Republic.
O. Henry—The Four Million.
O. Henry—Roads of Destiny.
Hutchinson—This Freedom.
Tarkington—Women.

A. J. Hammond, '89:

Fagan—Confessions of a Railroad Signalman.

F. A. Whitten, '98:

Chesterton—What I Saw in America.
Wharton—Glimpses of the Moon.
Marbacka—Selma Lagerlof.

J. H. Hall, '97:

Wason—Friar Tuck.
Wason—Happy Hawkins.

Alumni Notes

'99

Arthur P. Stone, C. E., '18, formerly an engineer with the Fairbanks Exploration Company at Fairbanks, Alaska, has returned to Salt Lake City and is with the U. S. Smelting, Refining and Mining Company.

'02

Arthur J. Paige, M. S., '06; M. E., '09, is in the Engineering Department of the Chrysler Corporation. Mr. Paige was the winner of the Hemingway Medal.

'08

Walter W. Willison, Ch. E., '23, is a Consulting Chemist in Brooklyn, New York. He was formerly General Manager of the Florida Citrus Products Company of Haines City, Florida.

'10

Henry M. Shaw is now Manager of the Southern Factory Branch of the Hanovia Chemical and Manufacturing Company at Atlanta, Georgia. Mr. Shaw was formerly the Managing Director of the Nippon-Hanovia Quartz Lamp Company, Ltd., at Tokyo, Japan.

Planck, ex '10, is teaching at Lake Wales, Florida.

'11

Edward J. Ducey, M. S., '14; C. E., '22, is now the Designing Engineer for the American Bridge Company at Pittsburgh.

(Continued on page 22)

ATHLETICS

Rose Wallops E. I. S. N.

Get Revenge—56 to 35

ROSE played their best game of the year on the home floor to obtain a sweet revenge on the Eastern Illinois Teachers for a defeat handed them early in the season to send them back to the Sucker State defeated by a 56 to 35 count. The Engineers had to play real basketball to defeat the visitors, but they not only did that but gave them a good trouncing while they were taking advantage of the opportunity.

The Charleston outfit perhaps did not put up the article of ball that they did when they met hteir conquerors in the early-season game, but Rose just outplayed them in every department in this game to win the victory and in a deserving style. Every man in the game for any appreciable amount of time took aim at the basket and connected to good advantage, while Hall and Gilmore did the best for the visitors. Lineup and summary:

Rose Poly—	F.G.	F.T.	T.P.
Thompson, f	3	0	6
Kasameyer, f	5	3	13
R. Alexander, f	1	0	2
K. Alexander, f	0	0	0
Berry, c	11	4	26
Dowen, c	0	0	0
Goddard, g	3	3	0
Keiser, g	0	0	0
Totals	23	10	56

E. I. S. N.—	F.G.	F.T.	T.P.
Cooper, f	2	2	6
Schulyer, f	0	0	0
Hall, f	7	0	14
Gilmoure, c	4	2	10
Meurlot, g	0	0	0
Story, g	1	1	3
Fenoglio, g	1	0	2
Worsham, g	0	0	0
Totals	15	5	35

Referee—Russell.

Earlham Wins Good Game

Beat Engineers 29 to 25

IN one of the best games of the year Earlham proved themselves to be the masters of Heze Clark's crew at Earlham and won a hard-fought battle by a score of 29 to 25. The game was a thriller throughout the entire contest and at no time did it appear evident that either team would win the conflict. Earlham, nevertheless, held the upper hand in the matter of scoring and finished with the same small majority that they held most of the game.

Alexander did his best to pull Rose's falling hopes in the last few minutes of the game, but his best endeavors, plus those of his mates, were to no avail and Rose's colors again were trailing. Alexander's work, when he was rushed into the game with about 10 minutes to go, gave his mates a new life and it seemed that the rally was going to end with the score reversed in Rose's favor. However, Earlham took a time out and came back with a vim that carried them through.

Wall and Jenkins played best for Earlham, while Goddard and Alexander did best for Rose. Lineup and summary:

Earlham—	F.G.	F.T.	P.F.
M. Cain, f	0	0	1
B. Cain, f	1	0	0
Druley, f	1	0	3
Cohn, f	0	0	1
Wall, c	5	3	2
Jenkins, g	3	4	1
Loch, g	0	0	0
Oberman, g	1	0	0
Totals	11	7	8

Rose—	F.G.	F.T.	P.F.
Thompson, f	1	0	1
Alexander, f	4	1	1
Kasameyer, f	2	2	1
Berry, c	0	0	4
Taggart, g	0	0	2
Goddard, g	3	1	0
Keiser, g	0	1	1
Totals	10	5	10

Rally Wins for Indiana Central

Greyhounds Triumph 37 to 35

STARTING out slowly and trailing the Engineers until about eight minutes to go the Indiana Central Greyhounds pulled a little surprise and handed the Engineers a 37 to 35 setback. The game had been fine enough for the Clarkmen and it seemed that a tilt was to be added to the column of wins, but the visitors had another viewpoint and stressed their ideas with field goals barely sufficient in number to gain the verdict.

Kasameyer and Berry were hitting the nets consistently for the Clark crew and their efforts seemed almost to down the Indiana Central boys, but a Greyhound by the name of Rider was working hard also and was keeping his outfit on fairly even terms. With the game seemingly won, the local fans were easing back in their chairs with a degree of satisfaction, when suddenly the tide grew deeper until Rose was finally submerged. It happened so quickly that the score was tied before the fans could get up pep enough to let out their usual words of encouragement and warning. Almost with the last gun Alexander got a clear shot at the goal, but the ball rolled devilishly around the ring and dropped harmlessly to the hands of a

(Continued on page 28)

FRATERNITIES

Theta Xi

ON the evening of February 18, Kappa's new pledge brothers were introduced to the social life of the fraternity, when they were entertained by the active chapter at the annual Pledge Dance. It was a night the pledges will never forget. The chapter house was decorated with the fraternity colors, light blue and white, and the illuminated Theta Xi badge over the fireplace seemed to put the old T. X. spirit into everyone. The band furnished some red-hot music and everyone was sorry when the party had to break up. Brother and Mrs. Wm. Bessell and Leuit. and Mrs. R. Selee acted as chaperones.

The snow and ice that covered the ground on February 23 was greeted by the brothers and their lady friends with a bob-sled ride. Brothers Leake and Nehf and Pledge Thomson constructed the sled and Brother Crawford furnished the power. After returning from a cold but enjoyable ride the gang gathered around the fireplace and sang school and fraternity songs.

After the basketball game on the evening of February 25 the brothers entertained with a Bunco party at the chapter house. A large box of candy was provided as a prize to the lucky girl and everyone had a wonderful time.

Brother Nancrede has just returned from the sixty-fourth National Convention of the fraternity at Minneapolis with some new ideas which will be an aid to us in the future.

Recent visitors at the house include Brothers Armstrong, Ruston, Kadel, Moore, and Mr. Dufendach.

Sigma Nu

ON Friday night, February 24, the annual pledge dance was given as a toast to the Sigma Nu neophytes. The affair was declared to be one of the most successful ever held by Beta Upsilon, and was by far the most outstanding success within recent years. A spirit of general gaiety presided over the affair with the dancers in the most intimate communion with Terpsichore throughout the evening. The fraternity house was tastefully decorated with the fraternity colors of gold, black and white, and the coefficient of friction was materially lessened as the dancers glided smoothly over the freshly polished floors (thanks to the pledges!)

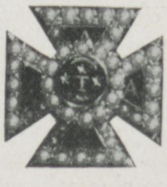
The music turned out far beyond the expectations of the brothers and was finally acclaimed as "darned good". Maurice Nicosin and His Jazz Pirates furnished the strains for the evening. At an appropriate moment the entire active chapter and pledges gathered about the orchestra and sang fraternity songs for the entertainment of "les femmes".

Chaperones were Dr. and Mrs. John White, Mr. and Mrs. Carson Simms, and Mr. and Mrs. Glenn Maxwell.

With the state dance dated for the 24th of March everyone is busily preparing for the gala event of the state. The dance this year will be at the Marott Hotel and will be broadcast over Station WFBM. This latter announcement was a pleasant surprise to the chapter representing Beta Upsilon in light of the fact that Rose Poly is allotted five minutes before the microphone. A committee consisting of Milo Dean, Jack Derry and Ray Harris has been appointed to arrange a program for the time when Beta Upsilon goes on the air. At the present time more than half of the chapter is planning on attendance and the affair bids high to be a prominent success.

Alpha Tau Omega

INDIANA Gamma Gamma is pleased to announce the pledging of Jack Simpson of Quana, Texas. He attended Purdue University prior to his entrance at Rose Poly at the beginning of the second term. He shows indications of becoming a real "Fighting Engineer".



"Open House" was held on the night of Feb. 19. The actives and their girls and the pledges and their girls turned out in full force, there being about forty-four present. Everybody had a good time playing cards and dancing and from the looks of things many conspiracies took place among the girls there. We have not found out yet whether it brooded good or evil for the fellows. Bob Alexander was heard to say something there about some one "going south with a duck under his arm" and after the last basketball game, from an unknown source, he was presented with a bran' new yellow duck with a detachable head. More conspiracy.

Brothers Bob Alexander, Art Keiser, and Al

Kasameyer were voted a varsity letter in basketball for the past season. When they receive their letters it will conclude their connection with college basketball. Kenneth Alexander has been showing up well on the squad in the past season and is expected to make a regular next year.

The annual A. T. O. State dance and banquet took place on March 3, at the Claypool Hotel in Indianapolis. The Banquet which was held in the Riley Room began at one o'clock. During dinner those present were entertained by Sinclair's Orchestra and some special dancing acts. After the dinner speeches were given by Province Chief Jefferies and some state alumni members, following which a report was given from each chapter. When the reports had been given, some A. T. O. songs were sung and everyone adjourned until the dance.

The dance in the evening was one of the best state dances ever given. Sinclair's Orchestra, which had played at noon, furnished the music for the dance, playing some of the newest and hottest pieces. Punch was served during the dance and at the Grand March the young ladies received favors. The dance lasted until twelve when it broke up and everyone went home to succumb to the wiles of the "Sandman". A glorious time was experienced on the week end in which Gamma Gamma had a goodly representation.

Theta Kappa Nu

THE annual Pledge Dance of Theta Kappa Nu Fraternity was given at the chapter house Saturday night, Feb. 25. The house was decorated in the Fraternity colors. Taylor's Nighthawks furnished some snappy music for the dancers. Bridge also was enjoyed by the guests. Honor guests were Dr. and Mrs. C. P. Sousley and Prof. and Mrs. O. L. Stock. Guests from the other Fraternities on the campus enjoyed the dance along with the members and pledges of Theta Kappa Nu. The dance was declared by all to be the best Pledge Dance ever given by the fraternity. Success of the dance was due to the committee in charge, of which Brother Procter was chairman.

Brothers Hillis, Balsley, and Robinson were recent visitors to the house. Brother Wilson, Grand Scribe of Theta Kappa Nu is also a frequent visitor to the house.

Brothers Sherwood and Watkins now have responsible positions with the Wayne County Highway Commission in Detroit, Mich.

Brother Mace has been receiving high honors for his superior Markmanship. He received first place in the Inter-Collegiate Rifle Match with the University of Dayton. Brother Mace also received a silver medal in the R. O. T. C. match.

Alumni Notes

(Continued from page 15)

'14

Walker H. Henry, who is with the General Electric Company, has been transferred to Ft. Wayne. Mr. Henry is interested in the Sales Department.

'17

Thomas M. Evans has been transferred to Erie, Pennsylvania, where he is with the General Electric Company.

'18

George B. Henry has been transferred from Schenectady to Chicago where he is with the General Electric Company.

'19

Clarence E. Pigg has been made Assistant Superintendent of the Tampa Gas Company at Tampa, Florida.

'20

Andrew T. Brophy is now Chief Engineer for the Bates Expanded Steel Truss Company at East Chicago, Indiana.

'21

William H. Junker, mechanical engineer with Harry Hake at Cincinnati, recently installed a device in the new home of the department of street railways in that city. Two boilers in the power house are fed by a 100-ton automatic coal stoker and have an arrangement for the use of exhaust heat in the drying of sand for use on slippery rails. The device, which was designed by Junker, is highly efficient in the transfer of sand from a 100-ton wet sand hopper, through a revolving heated drum, to a 300-ton dry sand hopper for gravity feed to street cars.

The work done by Junker amounted to one-third the cost of the total bid on the building which ran one million dollars.

'23

D. Vern Eichin, with the Standard Oil Company, has moved from Bakersfield to Fullerton.

Donald Mewhinney has taken a position with the Long Island Lighting Company at Mineola, Long Island, New York.

'24

Frederick W. Schroeder is with the Stevens Engineering and Construction Company, Designers and Builders of Reinforced Concrete Grain Elevators, Flour Mills, etc., at St. Louis.

Daniel E. Bundy writes that he is in the field office of the Colorado River Project. He is assisting in taking the preliminary surveys for the proposed Los Angeles Aqueduct, and his work deals mostly with the geodetic work. He writes that he is kept busy with keeping track of the large number of triangulation points, as the project is a large one.

'25

Lincoln E. Griffith is Office Engineer of the American Bureau of Inspection and Tests.

'26

E. Wayne Watkins and Max Sherwood are with the Wayne County Road Commission at Detroit, Michigan.

John S. Wells writes that he listened in on the Rose-Earlham basketball game through WRPI and enjoyed it very much.

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Public Utilities

(Continued from page 10)

ing department is only of the structural property and is not an accurate determination of the value of the property useful in the service which it offers. Thus the responsibility of fixing a value of the property lies with the commission, which must take into consideration inter-changeable values which may or may not be present. When the value of the utility is finally found, the commission then has only a foundation upon which to build a rate which shall cover operating expenses, depreciation, taxes, and a return as designated by law.

This is a general outline of the manner in which the Indiana Public Service Commission proceeds to value a property for rate-making purposes. Although this outlined method is rather vague, it will be clearly seen that the valuation of a property is not an easy matter, and that rate determination is still a harder task to perform properly, doing justice to the utility and to the public.

Invariably, public sentiment has been resolved in favor of lower rates, but rates have increased in a few cases and in some cases will continue to increase, whether there is a state regulation or not. The cost of furnishing utility service is beyond the control of either the commissions or the utilities in some cases. The bulk of the cost of gas and electric service is coal, and the increase of mine labor cost and freight rates has increased the cost of coal per ton in most localities.

Hence, if there was a general or local lowering of freight rates and the reduction was substantial, there would be cause for petition for lowering of utility rates. The same would apply if there was a general lowering of wages to mine workers. However, the cost of coal could be reduced by the use of improved mining equipment in mining the coal. Therefore, the price of coal to such utilities must be considered on the price where delivered at the plant and would be a very material factor in determining rates for such utility.

In the street railway and telephone business the principal items are labor and materials, and those costs have approximately doubled since before the war and show a tendency to increase rather than decrease. Equal in importance to coal, labor, and materials, is the matter of state and local taxes which have also more than doubled since before the war, and which are steadily climbing. This shows more obstacles encountered in the fixing of rates.

No mention, as yet, has been made as comparison between public and private ownership. The sole consideration under public ownership of the various utilities is to secure to everyone perfect service under just conditions, while under private ownership as practiced in America the sole motive is to obtain private profit; and even where good service is given, the motive remains the same. This comparison, in my opinion, is the sole argument in favor of public ownership; the only argument in favor of private ownership is in new local-

(Continued on page 25)

Thas Diffrunt

"You'se my best friend, I'd trush you with my life."

Tha'sh fine. Gimme a nuther drink outa that bottle."

I shaid my life."

Bill: "Oh, she's not so old!"

Willy: "Old! Why she remembers the Big Dipper when it was just a drinking cup."

Dr. Jones: "Do you think your son will soon forget his college education?"

Dr. Blace: "I hope so, he can't make a living drinking."

"Which way goeth thou, stranger?" questioned St. Peter, as he leaned over the Pearly Gates.

"Let me in," muttered the fleeting soul of convict No. 77, just released, "I just had the shock of my life."

"What is the reason for your coming to school?"
"I came for the rest."
"The rest?"
"Yes, the rest of the old man's money."

"How was Tom hurt?"
"Oh, by accident, he sipped and fell."

Mike: "What is done with the holes of doughnuts?"

Doc: "They're used to stuff macaroni."

"Are you willing to take a chance on modern liquor?"

"Sure, how much is a chance?"

The world prefers a good loser, especially if it gets some of his money.

Treason

"I heard MacDonald betrayed the Scots."

"How come?"

"He perspires freely."

Noncombatant: "You sure made a neat job of that pedestrian. How come?"

Combatant (modestly): "Oh, well, I just dashed him off."

Geography

"Papa, where do they make ukes?"

"Know your geography, my boy, in Yukon, of course."

"No matter where I hide," said the leopard, "I am always spotted."

Advice, Rhinies

"That Frosh thinks he's it."
"Well, let's beat it."

Often True

Wise: "He plays a fair game of poker."

Wiser: "Yes, if you watch him."

"They say Dorothy has lots of horse sense."

"Yes, she knows when to nay."

If Sitting Bull had had a good looking daughter, would he have called her Sitting Pretty?

Adam (to Eve): "Good heavens! These woman! Always ruining something. You've gone and made salad out of my Sunday suit."

Public Utilities

(Continued from page 23)

ities where private investment is needed and that is almost a thing of the past now.

The whole problem of rate regulation cannot be solved rigidly with a rule which will apply to all cases. There is, however, the necessity for outlining some general theory on which the municipalities should proceed. There will be the practical political difficulties of fixing rates and maintaining them at a just point, even if the procedure is clearly defined, and endorsed by high authority.

Our cities are becoming great business concerns, and should be managed fairly and scientifically, not only for the interests of the citizens within, but also for those who have financed in some way their utilities and early development.

The people's servants, the public service commissions, fix the rates and the people use as much or as little service as they desire, at set rates; then the people control their own utility expenditures.

Those are the reasons which show that the business of the utilities is in the hands of the public. The public utility business is the people's business.

Wille: "Pa, does bigamy mean that a man has one wife too many?"

Pa: "Not necessarily, my son. A man can have one wife too many and not be a bigamist."

The Why of the Televox

(Continued from page 13)

And then the buzzer at the substation buzzes out the information that breaker number five is open. The dispatcher pushes the button marked 900 and the loudspeaker says "Toot," which is short for "Close it." The buzzer then says that the breaker closed but opened again almost immediately. "Close it again." This time the buzzer says that the breaker stays in.

The 600 cycle button causes the speaker to say "Whoop", which is the way the Televox has of saying, "That is all. Goodbye." The substation hangs up; the dispatcher hangs up but immediately calls the service department and asks them to call the persons making the complaint to see if service has been satisfactorily restored, also to send out a man to patrol the line and locate the trouble if possible.

An ordinary ringing signal relay of the type used for operating special loud gongs or signal devices is installed by the telephone company and furnishes the initiating means for the rest of the substation equipment. The relay makes contact when the bell rings, thus energizing the magnet which lifts the weight from the hook switch and completes the circuit to the amplifying tube filaments. After an interval of about thirty seconds during which the substation buzzer sends out the station code at intervals, the actuating circuits will be opened by a timing device unless the dispatcher sends one or more 1400 cycle tones. This is to take care of wrong number calls which are inevitable as long as human beings use the telephone.

For portable use the device can be operated by three carefully tuned pitch pipes of the proper tones. This enables the line repair man to operate the substation breakers from any telephone in private houses or pay stations near the case of trouble. Testing of defective circuits is thus greatly expedited.

Means are available for reading meters, ascertaining the height of water in reservoirs, reading the temperature of transformers or other devices or in fact doing almost anything that needs to be done in the controlling of a distant substation.

Inquiry is frequently made as to the possibility of interference from the high frequency tones used in the Telavox. A little reflection will reveal the fact that the tones used are within those normally used in voice transmission. The volume is limited by the ability of the telephone transmitter to convert sound into electrical vibrations. The Televox therefore will not create any interference unless the circuit is so bad that cross-talk exists during ordinary conversation. This condition is not allowed to continue very long after the telephone company learns of it. And so we can answer with entire confidence that the Televox will not cause any more interference than ordinary conversation.

There will be many uses for Televox that are not apparent at this time. There must be many places where inexpensive remote control would fill a real need were the expense of control circuits eliminated. Such applications will undoubtedly develop as the capabilities of the Televox become better known.

Alumni Notes

(Continued from Page)

'27

Dick Brown has been transferred to Dallas, Texas, where he is located with the Link Belt Company. His address is 1221 Mercantile Bank Building.

ex '28

Ralph Andrews writes from Amarillo, Texas, that he plans to enter the University of Texas in the fall. He is in the office of the Chief Engineer of the Atlanta, Topeka, and Santa Fe Railway Company.

"What seems to be the trouble with that young Scotch student?"
"Oh, he just got a shine, and then found out they were his roommates shoes."

The smallest man in history is the Roman soldier who went to sleep on his watch.

"I take it you're trying to show contempt for the Court."
"No, your Honor, I'm trying to conceal it."

Rally Wins for Indiana Central

(Continued from page 16)

Greyhound who held it until the game came to an end. Lineup and summary:

Rose—	F.G.	F.T.	T.P.
Thompson, f	1	1	3
Alexander, f	0	0	0
Kasameyer, f	9	4	22
Berry, c	4	1	9
Taggart, g	0	0	0
Goddard, g	0	1	1
Keiser, g	0	0	0
Totals	14	7	35

Indiana Central—	F.G.	F.T.	T.P.
P. Bailey, f	3	1	7
A. Bailey, f	0	0	0
Thompson, f	4	2	10
Rider, c	7	1	15
Demmary, c	2	0	4
Umbert, g	0	0	0
Babbitt, g	0	0	0
Brenneman, g	0	1	1
Totals	16	5	37

Referee—Russell.

Visitor to 1987: "You know, stone walls do not a prison make, nor iron bars a cage."

No. 1987: "Well, if they don't, I've been a damn fool for sitting here this long."

Don't Forget

Your Subscription to the Modulus is Now Due

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On the Down Side of Our World

The Parliament Building of New Zealand at Wellington is equipped with Otis elevators

THE ANTIPODES! No other word in the language has such a far-away sound.

The old writers used to amuse themselves by imagining a land where everything was topsy-turvy; where people walked on their heads, built their houses upside down, and where the trees grew into the earth, spreading their roots into the air. And we of the north still feel a certain strangeness about these regions when we read of their cold, blustering Julys, and their rose-crowned Januarys,—merely a sign of our own provincialism, no doubt.

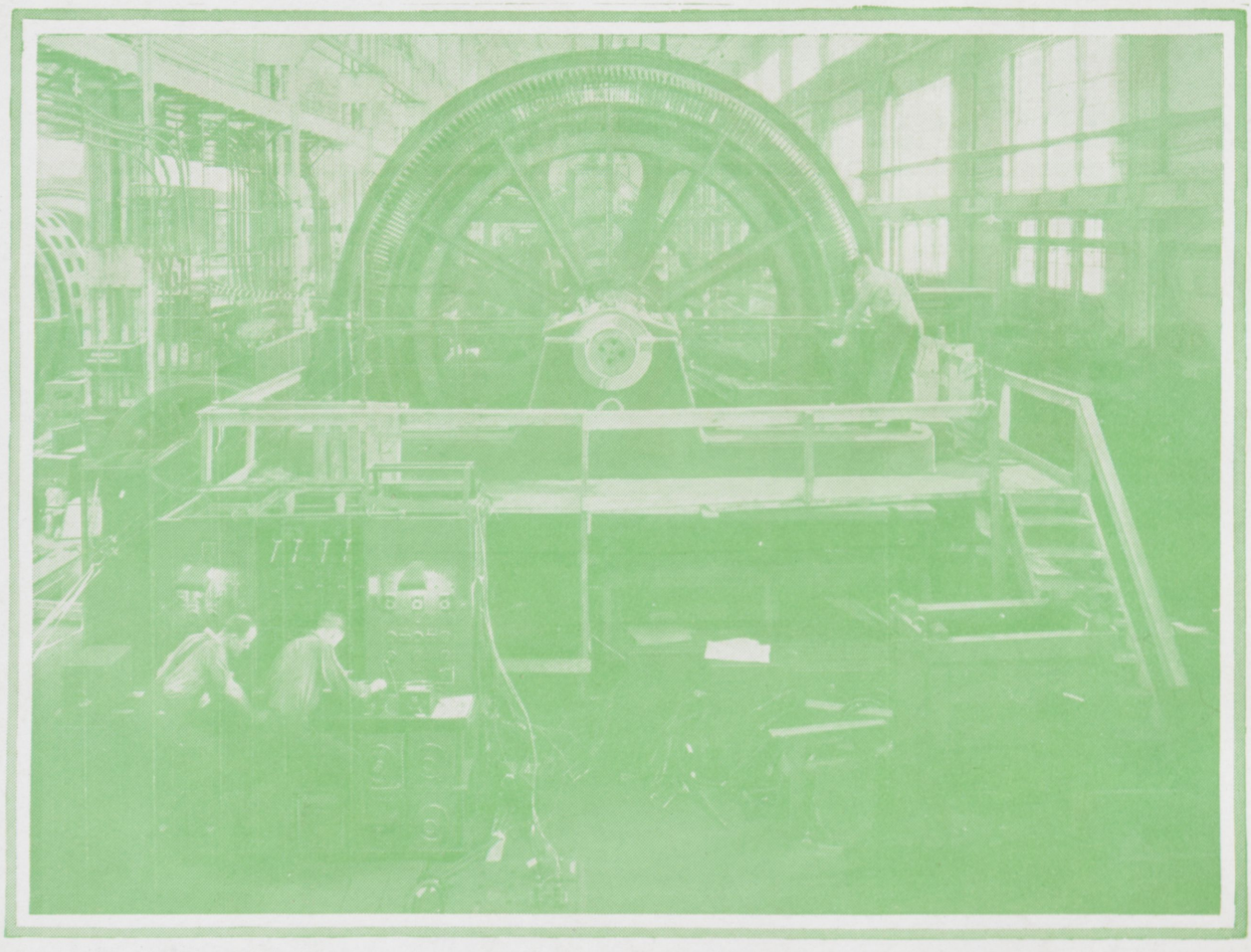
As a matter of fact, the real Antipodes are very much a part of the modern world. In Australia and New Zealand small towns are growing into cities, the cities are constantly being embellished with huge new buildings equipped with the latest type of Otis Elevators.

One of the old writers we have spoken of would doubtless ask if the elevator men in the Antipodes say "Up!" when the elevator is descending and "Down!" when it is mounting.

No matter how topsy-turvy the other side of the world may be regarded by some, the fact remains that Otis Elevators are accepted quite casually and do their daily work in antipodal buildings.

OTIS ELEVATOR COMPANY

Offices in All Principal Cities of the World



Responsibility

A year ago, these young men were studying engineering in college class rooms. Here we see them putting a 5000-horsepower synchronous motor through its paces. As G-E Test Men, they have charge of this work; upon them rests a definite responsibility for determining whether this machine measures up to G-E standards of performance and will worthily represent General Electric in the service of the customer.

Opportunities such as these mean much to the industry as well as to the man, for the future leaders of the great electrical manufacturing and electric power companies must of necessity be those who have learned to assume responsibilities.

The General Electric monogram is the symbol of an organization whose engineers have met their responsibilities by establishing principles and developing apparatus which have made General Electric a leader in the great electrical industry.

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